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AUTHOR Reeve, Richard
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ABSTRACT

This paper presents common design features of 4 elementary laboratory school classes implementing knowledge building over 1 year. It also explains that the specification and improvement of educational innovations, embedded in the design experiments methodology, is the kind of practice-based research laboratory schools should use in order to make contributions to educational reform. The paper describes the first year of a 3-year study on the support of new knowledge building schools and the development of a set of norms for successful knowledge building. During the first year, the focus was on establishing successful knowledge building communities in each classroom and recording the features of these classrooms and how they related to the underlying principles of knowledge building. Descriptive data are drawn from the Knowledge Forum databases, teacher journals, and researcher observations. The design experiments methodology is proposed for study years 2 and 3, during which time researchers can study iterative improvements being made in these classrooms as related to first year observations. The suitability of the design experiments methodology to the laboratory school environment and the laboratory school environment to the specification and improvement of educational innovations is discussed, along with use of videotape recordings to communicate these design specifications. (Contains 48 references.)(SM)

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The Knowledge Building Lab School: Principles to Practice

Richard Reeve, Teacher/Researcher
The Institute of Child Study - Laboratory School
Department of Human Development and Applied Psychology
The Ontario Institute for Studies in Education
University of Toronto

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ABSTRACT

This paper presents the common design features of four elementary Laboratory School classes as they implemented the educational reform of Knowledge Building over a one-year period. In addition, it presents the idea that the specification and improvement of educational innovations, embedded in the design experiments methodology, is the kind of practice-based research more Laboratory Schools should be engaged in if they are to be making contributes to educational reform. It has been stated that the issue of making educational reforms work is one of scaling-in, not one of scaling-up (Cohen and Ball, 1999; Tyack, 1995). By scaling-in it is said that the adopters engage in the specification of the intended classroom reform creating strategies for their success (Cohen and Ball, 1999; Cohen, 1998b). Major educational reforms often leave little room for specification by their adopters (e.g. standards based reform) while others are so loosely specified that only surface features are adopted (e.g. child-centered learning) (Brown, 1992). With respect to Knowledge Building, knowledge creation and pedagogical innovation are placed at the center of the classroom reform (Scardamalia & Bereiter, 1989, 1994, 1999). This paper reports on the first year of a three-year study on the support of new Knowledge Building schools and the development of a set of norms for Knowledge Building. However, during the first year of the study the focus was on establishing successful Knowledge Building Communities in each of the classrooms along with recording the features of these classrooms and how these features related to the underlying principles of Knowledge Building (Scardamalia & Bereiter, 1994, 1999). Descriptive data is drawn from the Knowledge Forum® databases, the teachers' journals and the observations of the participating researchers. The design experiments methodology is proposed for years two and three of the study during which time it will be possible to study the iterative improvements being made in these classrooms as it relates to these first year observations (Collins, 1999; Brown, 1992). The suitability of the design experiments methodology to the Laboratory School environment and the Laboratory School environment to the specification and improvement of educational innovations, is discussed. Also discussed is use of videotape to communicate these design specifications so practitioners in the field will be able to further specify the approach without moving it away from the core principles of Knowledge Building.

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Purpose

There are two main purposes for writing this paper. One is to describe the common design features of four Laboratory School classes as they attempted to take a Knowledge Building approach in their classrooms. Eventually, these design specifications are to be refined and made available to other school sites as they attempt to do Knowledge Building themselves. Also, these design specifications will be tested in design experiments to begin the iterative process of improving the design and potentially the theory of Knowledge Building itself.

The second goal is to present the idea that this type of design specification and improvement, that uses the design experiments methodology, is what Laboratory Schools should be doing more of as part of their ongoing research function. More to the point, this paper attempts, in a small way, to re-establish John Dewey's initial premise that the function of a Laboratory School should be the, "working out and testing" (Dewey, 1990, p. 94) of new educational approaches. The hope is that Laboratory Schools might again be viewed as a suitable environment for the initial development, testing and specification of educational innovations.

Dewey's Laboratory School – The Original Premise

In 1896. as head of the newly created Department of Pedagogy at the University of Chicago, John Dewey requested and was granted permission to start an elementary

school within the University (Dykhuizen, 1973, p. 79). His argument to the President of the University, regarding his new department's need for such a school, was as follows:

> "The conduct of a school of demonstration, observation and experiment in connection with the theoretical instruction is the nerve of the whole scheme. Without this no pedagogical department can command the confidence of the educational public it is seeking to lay hold of and direct; the mere profession of principles without their practical exhibition and testing will not engage the respect of the educational profession. Without it, the theoretical work partakes of the nature of a farce and imposture – it is like neglecting to provide a laboratory for faculty and students to work in." (Dewey, 1896a, p. 434).

In this quote and in others Dewey's original intention in creating the Laboratory School is clear. It was to be a place within the University where approaches to education could be worked out in real terms in order to demonstrate their feasibility and the methods that made them feasible (Dewey, 1900, p. 94). Although it is stated that hypothesis testing was the purpose of the school many have complained that it is hard to know when new hypotheses were being established and what gains were being made with respect to these hypotheses (Cronbach & Suppes, 1969 p. 50). Although the "wide appeal" of Dewey's progressive approach may have in part led to the lack of critical examination of the work done in his Laboratory School it is unfortunate that this lack of a "disciplined inquiry" became the norm for the Laboratory Schools that followed (Cronbach & Suppes, 1969 p. 51). It should be said that the issue here is not the progressive approach Dewey's school became known for, although it does bear some resemblance to the Knowledge Building

reform presented later. What is at issue is Dewey's original intention that Laboratory Schools be living laboratories for educational research and improvement.

Laboratory Schools and the Issue of Transfer

Dewey stated clearly that his Laboratory School was "not a model school" (Dewey, 1990, p.96). At the time there were Normal Schools, the main purpose of which was the training of new teachers for service in the public schools (Dewey, 1990, p.96). For Dewey the training of teachers and the modeling of set approaches were for others to do (Dewey, 1896b, p. 437). Yet how the insights and approaches, developed at what became known as the Dewey Laboratory School, were to be picked up and translated into positive changes in the public school classrooms was never clear (Cohen, 1998, p. 445; Jackson, 1990, p. xxxi). In a response to an unidentified teacher regarding her concerns over how different the Laboratory School environment was compared to other school environments Dewey had little to offer in relation to how she should proceed (Jackson, 1990, p. xxxi). In a report to the University he seemed to hint that the insights of the Laboratory School would make their way into other schools in a gradual way (Dewey, 1896b, p. 437). He said, "it is the function of some schools to provide better teachers according to present standards; it is the function of others (his Laboratory School) to create new standards and ideals and thus to lead to a gradual change in conditions" (Dewey, 1896b, p.437). However, how this "gradual" change in the educational conditions of public schooling was to play itself out seems never to have been fully

defined by Dewey. Perhaps he just didn't have time to formulate this process before his departure from the University of Chicago's Laboratory School in 1904. Dewey seems to have known the issue early on as he was establishing the approach that was to be associated with his Laboratory School,

> "If it is advisable to have smaller classes, more teachers and a different working hypothesis than is at present the case in the public schools, there should be some institution to show this. This the school in question hopes to do, and while it does not aim to be impractical, it does not aim primarily to be of such a character as to be immediately capable of translation in the public school." (Dewey, 1896b, p.437)

Given the educational climate into which Dewey had thrust his vision his vision of schooling it is fair to say that it did show what was "possible" in education when conditions were close to ideal. Unfortunately, Laboratory Schools today must rationalize their existence in more ways than simply presenting a vision of an educational ideal. Today Laboratory Schools serve multiple purposes including teacher education and the support of research programs at their respective Universities (National Association of Laboratory Schools, 1991, p. 24). That Laboratory Schools could have a positive role to play in the reform of education seems not to be a primary pursuit for these schools (Tanner, 1997; National Association of Laboratory Schools, 1991, p. 164). But perhaps what has been missing is the right methodology for researching and presenting the work done in Laboratory Schools such that a disciplined methodology could make the work both scalable and accessible to those in mainstream education.

Scaling-in: Getting to "The Core" of Education

The issue of how best to scale-up educational reforms has been the focus of researchers ever since the release of A Nation at Risk (National Commission on Excellence in Education, 1983; Cohen and Ball, 1999; Fullan 1999; Cohen and Hill, 1998; Darling-Hammond, 1997b; Elmore, 1997, 1996). The general consensus is that it is both complex and difficult to scale any educational reform, "beyond the pockets of excellence" of those teachers and schools that have been initially successful with their use (Elmore, 1996, p. 1). That there are major structural issues to be dealt with is clearly acknowledged (Darling-Hammond, 1997). However, several researchers have started to focus attention not on the big systems of education but instead on the fundamental elements of teaching and learning. These elements include teaching, learning and the nature of knowledge and/or content (Cohen and Ball, 1999; Elmore, 1996). Richard Elmore stresses that the focus must be on "the core" of educational practice which includes the nature of knowledge, the students' role in learning and how, "these ideas about knowledge and learning are manifested in teaching and classwork" (1996, p. 2). Elmore has gone as far as to say, "that attention to the problem of providing access to new knowledge and skill for teachers should supersede attention to the problem of how to restructure schools" (Elmore, 1997, p. 241).

Linda Darling-Hammond (1997) and other educational researchers have pointed to teacher learning and the development of highly skilled teachers as a key component for

the adoption of new educational reforms (Cohen and Ball, 1999; Darling-Hammond, 1997b; Lieberman, 1995; Goodlad, 1994; Cochran-Smith, 1991; Shulman, 1987). To teach in these new ways is a complex matter that requires both professional development and extended contact with these new approaches. Teachers need to have the opportunity to see images of what these innovative approaches look like in real terms yet they also need to be granted the opportunity to adapt the approach to suit their specific environment. For to over specify an educational approach is just as bad as to under specify it, both levels specification rendering the educational innovation as potentially inaccessible to practitioners (Cohen, 2000). The starting point would seem to be the generation of an appropriate level of description for these new ways of teaching and learning. That the specification of the innovation in real terms so that it both follows the guiding principles and is an accessible image of how to proceed would seem to be essential.

Specification of Educational Innovations

Ann Brown, Joe Campione, Marlene Scardamalia and Carl Bereiter have all written about their respective educational innovations in terms of the principles that define them (Brown, 1992, Brown & Campione 1994, 1996, Scardamalia, 1999). Brown and Campione have stated,

> "We need to specify FCL (Fostering a Community of Learners) in sufficient detail to communicate its essential features to: (a) ourselves, so we can refine the design of the environment; (b) our colleagues, so they can elaborate, help clarify, and

> criticize our views; and (c) teachers and administrators, they can put the program into place in their classrooms, schools, and districts. It is for these reasons that we have been concerned with the development of a set of first principles of learning to guide research and practice" (Brown and Campione, 1996, p. 291).

Brown and Campione go on to say,

> "Without adherence to first principles, surface procedures tend to be adopted, adapted, and ritualized in such a way that they cease to serve they "thinking" function they were originally designed to foster. This proceduralization of surface activities has been the fate of many innovations, notably cooperative learning" (Brown and Campione, 1996, p. 291).

Scardamalia and Bereiter have sought to define their educational innovation of Knowledge Building in terms of eleven defining principles[1] (Scardamalia, 2000). But in both of these cases the underlying principles are difficult to understand when they are presented outside of the classroom context in which they are to be applied. How best to represent these principles is an ongoing issue (Scardamalia, 2000). Without an understanding of the underlying principles, especially as they relate to the systematic whole they are part of, teachers tend to modify the surface elements of the approach to the point that a 'lethal mutation' of the innovation takes place (Brown and Campione, 1996, p. 292). What is needed is a way for the development work related to these new ways of teaching and learning to have some methodology that doesn't remove it from, "the blooming, buzzing confusion" (Brown, 1992, p. 2) of classrooms. That this work would be in a state of continuous development such that the principles would never

become static and/or unrelated to the work of the practitioners in the field seems also to be important. What is needed is a methodology that brings together the defining of new approaches to teaching and learning with the needs of practitioners to have good images of what these new approaches to education should look like in practice. The design experiments methodology seems to fit both of these ends.

Design Experiments Methodology

Allan Collins has stated that the methodology of design experiments came about as, "a reaction to the traditional psychological experimentation, which has dominated education research about teaching and learning" (Collins, 1999, p. 290). One "design scientist" has described the methodology in these terms,

> "I construct innovative learning environments and simultaneously conduct research on teaching and learning therein. My emerging understandings are fed back into the same classrooms to bring about, and amplify positive conditions of learning." (Roth, 1998, p. xvii)

With respect to educational reform, one of the most appealing attributes of the design experiments methodology is this focus on the core elements of teaching and learning that take place in real classroom settings. Collins has said that design experiments are set in the "messy situations that characterize real-life learning" so the learning that is being studied actually looks like the kind of learning that children really do in classrooms (Collins, 1999, p. 290). The researchers who have written about the design experiments

[1] See Appendix A for a summary of the eleven principles.

methodology have indicated that the underlying theory itself can be refined and improved through these design experiments (Collins, 1999; Wolf, 1998; Brown, 1992). But it is the practical side of this design science that is going to be of most benefit to those interested in educational reform. From this perspective, the question then becomes what are the features that must be present in order for learning of this type to take place? (Brown, 1992, p. 31) Collins has stated, "in design experiments there is no attempt to hold variables constant; instead the goal is to identify all the variables, or characteristics of the situation, that affect any dependent variables of interest" (Collins, 1999, p. 291). So the development of a profile, that characterizes the design in practice, is one of the goals of this methodology, and is the one that would seem to be needed first in order for subsequent iterative improvements to be studied (Collins, 1999, p. 292). It is by way of access to these profiles, developed through the "thick descriptions" of these designs in practice, that the work of design scientists may be helpful to practitioners in the field (Roth, 1998, p. xvii). David K. Cohen has pointed out that many current educational reforms don't provide the kind of designs for teaching and learning that practitioners need to begin developing their own approaches to the new educational innovations they are expected to use (Cohen, 2000). The problem is then, how do we engage in creating these essential characterizations and how do we do so without experimenting with the design in an environment that doesn't allow for mistakes and or design detours? That the Laboratory School setting is a special setting is not in dispute. However, given the

mandate for research it would seem that the Laboratory School environment is an untapped resource for the development and specification of new educational approaches.

Year One – Establishing Knowledge Building Communities

Background

The Institute of Child Study (ICS) Laboratory School at the University of Toronto was established in 1926 as one of the Rockefeller Centres for Child Study. The ICS Laboratory School's main purposes over the years have been to act as a support site for the teacher training program at the Institute and to be a stable resource for faculty research initiatives regarding children's issues. Typically, this research participation has entailed serving as a site for pilot studies and for the testing of new research instruments before they go on to be used in the field. Up until five years ago the teachers at the ICS Laboratory School had not been involved as primary investigators in the research agenda of the University. In 1996, the ICS Laboratory School applied for and received funding from the Ontario government for two of its teachers to begin working with researchers from the CSILE Project (Computer Supported Intentional Learning Environment) at The Ontario Institute for Studies in Education (OISE/UT). The goal of this initial research project was for the teachers to explore and define their "technology of use" related to the implementation of the CSILE computer system in their classrooms (Reeve & Lamon, 1998; Caswell & Lamon, 1998). This initial involvement with the CSILE Project subsequently led to the ICS Laboratory School's current participation in a three-year

study regarding the norms of Knowledge Building and the issue of how best to support other schools wanting to take a Knowledge Building approach. This paper reports on the first year of this three-year study during which time three of the participating teachers were new to the Knowledge Building approach and were therefore primarily focused on understanding how to implement Knowledge Building in their own classrooms. The fourth teacher had taken a Knowledge Building approach during the previous three years but was teaching a new grade level. In addition, a teacher was hired by the Knowledge Forum™ Project (formerly the CSILE Project) to support the teachers' implementation attempts and to help document this work.

Knowledge Building

In defining what Knowledge Building is Scardamalia and Bereiter draw a sharp distinction between learning and Knowledge Building (1999, p. 286). In a Knowledge Building classroom the development of knowledge is the main goal of the students while learning is done in support of the Knowledge Building efforts (Scardamalia & Bereiter, 1999, p. 286). Scardamalia and Bereiter have described the classroom community that develops in the following way, "...the classroom community works to produce knowledge- a collective product and not merely a summary report of what is in individual minds or a collection of outputs from group work." (Scardamalia, 1996b p. 254). For Scardamalia and Bereiter the class that adopts a Knowledge Building approach must make a shift from an incidental focus on learning activities to a focus on the construction

of collective knowledge as the central purpose (Scardamalia & Bereiter, 1999). Teachers who want to take a Knowledge Building approach in their classrooms sometimes have difficulty with the learning and Knowledge Building distinction and the idea of viewing their class as a Knowledge Building community that is engaged in the social practice of Knowledge Building (Scardamalia & Bereiter, 1999, p. 278).

The other difficult component to comprehend is its conception of the nature of knowledge in these Knowledge Building classrooms. In term of the Knowledge Building approach, knowledge is something that can be objectified such that it can be "discussed, tested, taught, applied, evaluated, and credited with causal force" (Scardamalia & Bereiter, 1996b, p. 254). Essentially, knowledge is improvable. In this respect Knowledge Building classrooms are likened to scientific research teams where new knowledge gets feed back into the research cycle on an ongoing basis (Scardamalia & Bereiter, 1996b, p. 255). How these improvable knowledge objects are handled by the Knowledge Building class varies but one important element in this knowledge objectification is the use of the collaborative computer environment called Knowledge Forum™ (KF). KF is used to objectify the ideas of the class members so that theories and information can become objects of discourse in the construction of the collective knowledge. In addition, classes also develop "social processes aimed at improving these (knowledge) objects" (Scardamalia and Bereiter, 1996, p. 254). As mentioned, one of the

goals of this study was to identify the common social processes or design features that contributed to the improvement of knowledge in the participating classes.

Method

Several processes were put in place in order that "thick descriptions" could be made of the year of Knowledge Building that took place in each of these classes. Teachers and researchers were asked to record their actions and observations in a database view referred to as the Calendar of Inquiry (COI). In some ways the COI's were the place that reflection and curriculum development and planning took place for each of the classes. Videotape was gathered for many of the large group activities and discussions. The Knowledge Forum™ databases and the observations of the researchers also served as data sources for the following analysis.

Common Knowledge Building Design Features

The common design features of these classrooms are be presented essentially as they occurred through the year. Only those features that were present in two or more of the classes are presented. Reference is be made to the Knowledge Building principles related to each of these design features. A process account is included for the first design feature, "Crosstalk: Knowledge Building Talk Off of the Computers" to illustrate how features that developed in the classroom were tracked in the Calendars of Inquiry and how some of these design features were established. Beyond this first example the

remaining design features are described along with their connection to the principles of Knowledge Building but the process account is omitted.

Crosstalk: Knowledge Building Talk Off of the Computers

That the software environment of Knowledge Forum™ affords the classroom a place to discuss the knowledge being developed is a understood. Yet there is a need that develops in these classrooms that requires the development of a way to talk about the knowledge off of the computers. Each of the classes found their way to using a modified version of the FCL (Fostering a Community of Learners) strategy called "Crosstalk" (Brown and Campione, 1996). In the version of Crosstalk that developed in these classrooms there was typically a set of rules and processes that became associated with this design feature. The children sat in a circle along with the teacher. The teacher was treated as an equal member of the group, meaning they needed to raise their hand to speak. No one could raise his or her hand to speak until the previous person had finished speaking. The talk was based not on a topic but instead on a problem of understanding or knowledge advance from one of the members of the class. When the group would move off of the problem of understanding or knowledge advance (that they had started with) then the teacher would come out of the Crosstalk to re-establish the focus of the group. One class developed an elaborate process around the filling-out of cards to indicate there was a reason to hold a Crosstalk. Most classes however held these sessions once a week for roughly 30 minutes, as there were always problems of understanding to address. This

design feature relates directly to the principle of "Knowledge Transforming Discourse" where participants engage in discourse geared to knowledge creation (Scardamalia, 2000).

At the beginning of the year the grade 4 class has just started to talk as a group in a circle but there were issues as can be seen in the teacher's Calendar of Inquiry (COI) entry for week 7 (See Figure 1).

> Cross talk is still a mystery for us. It seems it is dominated by 4 or 5 opinionated students and some others actually "drop out". We need help with this Richard! First we began by reviewing the cross talk rules: no interruptions, no hands-up while someone speaking, teacher is not in charge, encourage all students to contribute and the sense that it's not my or your idea but "the idea". C.R. wanted to take this opportunity to suggest "her" idea of creating a glossary at the end of the black books for new terms. Some students didn't think it was necessary. S.C. had a rise-above and said "it's a suggestion, thank you for sharing". M.B. expressed her feelings about yesterday's rotation - that the groups of 11 were too big for effective reciprocal teaching. Students talked about mini-groups studying the same reading.

Figure 1. Calendar of Inquiry entry during week 7 by the grade 4 teacher

The researcher builds onto the teacher's COI note in the database to give him advice about what crosstalks aren't generally about. She then presents reinforcement for a focus on knowledge advances and problems of understanding. She also suggests a few more possible rules that could be used (See Figure 2).

Crosstalks aren't about procedures (making glossaries) but about knowledge advances and problems of understanding. You might want to make that clear to students. In some classes they have a rule that one can't put up their hand after speaking unless two other people have spoken in the meantime. Students should direct their next question to someone who hasn't spoken. If that person has nothing to say then he (she) hands off to another person who hasn't spoken. This may sound funny but it is important that each person speaks even if it is just to hand off to someone else. In some classes teachers have each person contribute by going around the whole circle. Cross talks take a long time to establish so don't be discouraged.

Figure 2. Research responds to the teachers concerns

The teacher replies in that he appreciated the note and that he had received similar support from another teacher. Again these suggestions relate to problems of understanding and knowledge advances (See Figure 3).

Thanks Mary for the information on successful cross talk procedure. Earlier today when I spoke to Richard R. , I recorded the following notes about how he ran cross talk.

1. Ask students if anyone has a **knowledge advance**; could simply be a reference to a, or description of, a teaching note from K.F. Teacher can write the Knowledge Advance title on black board prior to cross talk and students can sign up. From this a cross talk develops.
2. **Dilemmas of Understanding**: Ask students is there something that they are dealing with but are not making advances yet feel it significant and need help.
3. **Technical Concerns:** deals with how to use the database, e.g. how students are using scaffolds, rise aboves, etc. It is teacher-led and is important in the first months of work on K.F.

Figure 3. Response by teacher indicating new knowledge about how to proceed

The researcher replies indicating agreement with what has been said and then states the principle of Knowledge Transforming Discourse (See Figure 4).

> I'd agree with Richard's advice. My theory is that both Richard R. and I are focused on issues and problem in advancing knowledge. It may help to ask students beforehand about their knowledge advances/problems of understanding but that may or may not help those who don't speak. Richard didn't have this problem so much last year because all of his children were in their second or third year with KF.

Figure 4. Researcher states the core idea contained in the principle of Knowledge Transforming Discourse

In Figure 5 we see a Crosstalk from later in the year where the class remains focused on the question and consistently builds onto the person who spoke before them. They use the "language" of Knowledge Building and appear to be concerned with advancing their understanding related to the problem of understanding.

RM: why did Shakespeare include the idea of "arranged marriages" in Midsummer Dream?
DH: to show people that things don't always work out the way you want them to
MB: "Shakespeare wanted to affect the world"
CR: wrote plays to say "hey, they (the characters) are brave enough to do this (elope), why don't others?
ZR: I think that fathers wanted daughters to marry wealthy men because would improve his class
ICM: the ending of the play proves that Shakespeare disagrees with arranged marriages
JS: I know that Shakespeare did marry out of love because he wrote all love plays and sonnets
RM: Was shakespeare in love - he lived in London and his wife in Stratford?
MB: we have no evidence that Shakes was in love, may be he was so jealous about love that he had to write about it, he wished he had love
JS: my evidence is that in his will, Shakespeare left stuff for his wife
RM: G. S and SCu have volunteered to research his personal life for next cross talk
RM: do our research findings change our understanding of Shake's play?
GS: definitely, we understand the language better
MB: as we learn more about the life style of the time, the way they put on plays in the Globe, we now can understand why he wrote the Helena and Demetrius story, I can understand a lot better, even Mabin students would see Hamlet in different way because of our presentation to them
JS: may be Hermia and Demetrius are really about Shakespeare and his wife
RM: RC will research the laws of marriage at Shakespeare's time to see if like described in play
RM: can we hear new information from anyone in the group? Children provide new information.

Figure 5. A Crosstalk transcript from week 31

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The children had their first cross talk after project time. Richard explained the concept behind and rules governing a cross talk and then asked if their were any problems or questions that could be brought to a cross talk that day. M.R. suggested the problem "Why don't all birds migrate?" There seemed to be three main ideas, which came out
1/the birds that stay have lots of feathers
2/ the birds that stay have bigger feathers
3/ the birds that stay like winter..."live in winter".

All the children present but 4 participated. Several children were sick and some were out with Liz.(missing were D.B., L.P., D.N., C.B., A.M., L.T. and M.W. for part) We will need to remeber to review expecations for the next few times to ensure that these children are aware of expectations. G.M. emerged as a child who would like to lead, focus discussion. J.L. restated other children's ideas and built upon them. G.B. tried to change discussion to a completely different topic (cars) but helped to illustrate that crosstalks are about building understanding of one idea or question. Richard modelled the acknowledgement of another person's idea that he had never thought of before.

Figure 6. Grade 1 class uses Crosstalk for the first time.

The design feature of Crosstalk appeared in all of the classrooms including the grade class. In grade 1 the topic was sometimes suggested by the teacher but this was not always the case. In Figure 6 you can see that the children had several generative questions that they wanted to talk about. In most of these classrooms it was important at the end of the crosstalk to identify what needed to be done next and who was going to take responsibility.

Getting Started: Beginning with Student Questions

Typically the starting points in these classes were the students questions. Often there was a kick off activity to stimulate them and give a bit of base knowledge so their questions could have some ground to stand on. The questions were often put on a bulletin board. By moving similar questions together they got a sense of what 4 or 5 questions the group had about the topic. Several classes developed a technique around the children writing proposals about which of the 5 questions they would like to work on. It was explicitly suggested that students could take the approach that they were really interested in a particular question. Others could say they knew a lot about that question and therefore could make a positive contribution, or they might say they really felt that question is something they didn't know anything about and therefore would like to work on. The stress was on responsibility - the group members who got to work on the questions were doing so for the class as a whole - since the other students would be coming to their view later to learn from them. The other technique for starting was to ask one generative question and to allow them to begin writing about it in the database. From the responses the children write there are often questions to move onto but this can become chaotic and serve to dissipate energy. This design feature deals with the principles of "Democratizing Knowledge" in that all community members are empowered to engage in knowledge creation and "Community Knowledge" because the

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class is sharing responsibility for advancing the frontiers of knowledge for all members of the class (Scardamalia, 2000).

Develop a Mission Statement for the Class

This design feature is based on the principle of Pervasive Knowledge Building which says that Knowledge building is at the heart of an organization's mission, and it is not an add on. (Scardamalia, 2000). It is also based on the Community Knowledge principle that "team members produce ideas of value to others, and share responsibility for advancing the frontiers of knowledge" (Scardamalia, 2000). Several of the classes actually wrote their mission statements both on the wall of their classroom as well as in their database. Although one attempt was made to generate the mission statement within the database this was often done during a Crosstalk. The mission statements contained both the domain that the children were studying and the level to which they were going to work towards, "...as much as grade 4 students can understand about...". Teachers used the mission statement to check that the children's questions were on track and to refocus attention during Crosstalks.

A Way for Reading Difficult Texts

All of the classes, including the grade 1 class, had to deal with the issue of reading difficult texts that were above their grade level. This problem came about because the children's Knowledge Building was not limited to the texts of a particular grade level. Their questions often required them to read resources from the .nternet, Science Journals

and High School textbooks. All of the classes settled on the use of an adapted form of Reciprocal Teaching (RT) which ended up referring to as Reciprocal Reading (Brown and Campione, 1996). Where RT stresses the use of roles to promote comprehension strategies the Reciprocal Reading approach typically was a group process used to comprehend the difficult texts that were being used by the children in the Knowledge Building. The strategy essentially had all students receive a photocopy of the reading. Each child would read a sentence or paragraph (or the group would read silently) then the reader would ask if anyone didn't understand any words in the passage. Then they would ask if there were any new, important or interesting information that they should record in their notebooks or in the database. Many of the classes incorporated this reading activity as one of its standard activities during rotations or as a choice activity if a reading needed to be dealt with at any particular time. This design feature relates to the "Constructive Use of Authority" because the use of texts in Knowledge Building is a form of authority being brought into the classroom. The children must deal with the texts in a way that helps them to build their knowledge in a constructive manner.

The Duality Issue: See Inside and Outside the Database

All of the classes found ways to deal with the problem of reconciling knowledge building events on and off of the computer. There were important knowledge building episodes happening in the database that were not being represented off the computer while there were knowledge issues and insights being dealt with off of the computer were

not making their way into the database. Several of the teachers developed bulletin boards that sought to mirror at least the questions and view topics being dealt with by the class inside the database. When at the computer lab the teachers would often sit the children in front of the data projector to talk about what was being worked on inside the database. Students would often use this time to present their knowledge advances using their notes inside the database. When no database projector was available one strategy used was to take a picture inside the computer of the view or note in question and to make an overhead for viewing by the class. If during the presentation there was a need to know exactly what was inside a particular note someone would open the note and read it. This design feature relates to the principle of "Pervasive Knowledge Building" because it attempts to bring the two worlds of the computer and the classroom life together.

Clutter as a Pedagogical Opportunity

Views in the database can become very messy very rapidly. How the group chooses to deal with the mess can determine if the knowledge building will continue or not. There were several techniques that were developed for dealing with the cluttered view. Some classes assigned caretakers to attempt clean-ups of these views. Others printed all of the notes in the view and had the children read and sort the notes into categories that could map onto the creation of new views. Some began to use the database tool of rise-above to pool similar notes to add coherence to the view and or to move the notes to a new view inside these container notes. All of these strategies share the

intention that there is a need to deal with the clutter in order to gain clarity and get on with the knowledge building again. But also that the act of adding coherence can bring a better understanding of what knowledge issues the class is dealing with at any given time. This design feature relates to the principle of "Rise Above It" dealing with the messiness and complexity that comes with active Knowledge Building classrooms (Scardamalia, 2000).

Portfolios as a Means of Tracking Individual and Group Knowledge Growth

Most of the teachers used portfolios within the database to track the growth of knowledge for each of the children. The grade 1 teacher kept a class set of notes that related to the concepts she wished to have the children learn while the other classes had the children keep their own views. Most teachers had the children divide their views into three sections, one for knowledge growth, one for notes they were proud of, and a final section on reflection notes about themselves as knowledge builders. Most classes had the children start one note at the beginning of the year about the topic they were studying, which they would alter as they went through the year. This design feature relates to the principle of "Constructive Assessment" because through the assessment there is an attempt to continue to advance the Knowledge Building work of the class.

Communicating to Parents: Evening Presentations about Group Knowledge

All of the classes sponsored some type of parent night during which time the children related what knowledge they had built and showed the artifact from the database.

It was important that the parents see all of the knowledge that had been created by the class and not just the aspects that their child had participated in creating. This design feature relates to the principle of "Community Knowledge" because one of the goals of these parent events is to communicate to the parents and the children that they Knowledge Building that they engaged in was in order to advance the communities knowledge not just the individual's knowledge base.

Discussion

It is not uncommon for readers to come away from the final few pages of School and Society (1900) with the idea that Dewey's Laboratory School was not intended to reform education on a broad basis (Cohen, 1998b, p. 442). Although his original intention was to create something that would appeal to educators in the field, he clearly had no real sense of how these innovations were to be picked up by those in the field (Cohen, 1998b, p. 442). That Laboratory Schools seem to continue to stand outside the educational reform efforts now underway could perhaps be a problem of methodology. Cohen (1998) has suggested that if Dewey had spent time concerning himself with "teacherly work" (p. 445) we might not be failing so repeatedly to improve our schools. It is no longer enough for Laboratory Schools to just establish an educational ideal, although that is important work that should continue. Laboratory Schools need to do, in a systematic way, what exemplary teachers have always done when trying out new approaches. Cohen says that these teachers, "devise the strategies, make or adapt curriculum, consider classroom

tactics, learn from students' work and their own, and in other ways create the intellectual and social infrastructure that enables their students to capitalize both on the visions that inspires their practice and on the hope that sustains it" (Cohen, 1998, p. 445).

If Carl Bereiter's "hybrid-culture" of research and practice can become the norm for professional activity within Laboratory Schools then teachers and researchers could be focused on a shared agenda related to developing and researching a particular educational reform (Collins 1999, p. 296; Bereiter, 1997). That a profile of what Knowledge Building can look like could help other teachers in other schools is certainly a possibility if the right level of specification can be reached. That this kind of design experiments research could also inform and possibly alter the theory of Knowledge Building would seem to be an expectation of a full implementation of this methodology. Ann Brown said ,"...the best way to contribute to the development of such emergent theories of learning is through careful study of innovative settings for learning." Brown and Campione, 1996 , p.290). It has not been the purpose of this paper to enter into an analysis of how this design work may have altered the theory of Knowledge Building. That this type of analysis is needed, on an ongoing basis, is a major step for later work.

One final comment on how these design features could best be communicated to those in the field. One of the most promising avenues appears to be videotape. As Ann Brown also said, "the advantage that modern designers of classroom innovations have is that they make videotape records for archival purposes" (Brown, 1992, p. 32). That these

archival videos could be used for professional development has been suggested by several educational researchers (Tochon, 1999; Lampert and Ball 1998; Cohen, 1998a; Hasseler and Collins, 1994). The potential is there to record the design features and any pertinent comments that would aid understanding of the profile and its limitations. This is potentially the next avenue for developing a means of supporting Knowledge Building in other sites. But first there needs to be a good sense of what the approach entails in specific terms. This paper has attempted to begin identifying these design features. It has also attempted to suggest that the Laboratory School environment is potentially a suitable place for these efforts to be based. Certainly that seems to have been the goal of their creator.

Appendix A

Principle #1 Knowledge Transforming Discourse	Participants engage in discourse geared to knowledge creation
Principle #2 Pervasive Knowledge Building	Knowledge building is at the heart of an organization's mission, not an add on.
Principle #3 Community Knowledge	Team members produce ideas of value to others and share responsibility for advancing the frontiers of knowledge
Principle #4 Real Ideas, Authentic Problems	Ideas are real things--they cause things to happen, they develop momentum, they cause reactions and counterreaction--people even die for them.
Principle #5 Improveable Ideas	Understanding-driven inquiry mirrors idea-improvement processes used by great thinkers.
Principle #6 Epistemic Agency	Knowledge builders take charge of their own learning, exhibiting the highest levels of responsibility for personal understanding and for the creation of cultural artifacts.
Principle #7 Constructive Use of Authority	Knowledge innovation requires a critical stance, combined with a proper degree of respect for authority.

Principle #8 Democratizing Knowledge	Establish the conditions and means by which all community members are empowered to engage in knowledge creation.
Principle #9 Symmetric Knowledge Advancement	Participants advance the knowledge of others in the course of building their own knowledge.
Principle #10 Rise Above it	Deal with diversity, complexity and messiness, transcend expectations and oversimplifications, and move beyond current best practices.
Principle #11 Constructivist Assessment	Assessment is a part of the effort to advance knowledge.

References

Bereiter, C. (1999). Education and Mind in the Knowledge Age: [on-line]. Available. http://csile.oise.utoronto.ca/edmind/edmind.html

Bereiter, C. (1997). Fusing the Research and Practitioner Cultures in CSCL. Paper presented at the Conference on Computer Supported Collaborative Learning, Toronto, ON.

Bereiter, C., & Scardamalia, M. (1993). Surpassing Ourselves: An Inquiry into the Nature and Implications of Expertise. Chicago: Open Court.

Brown, A. L. (1992). Design experiments: Theoretical and methodological challenges in evaluating complex interventions in classroom settings. The Journal of the Learning Sciences, 2(2), 141-178.

Brown, A., & Campione, J. (1996). Psychological theory and the design of innovative learning environments: On procedures, principles, and systems. In L. Schauble & R. Glaser (Eds.), Innovations in learning: New environments for education (pp. 289-325). Mahwah NJ: Lawrence Erlbaum Associates.

Caswell, B & Lamon, M. (1998, April). Development of Scientific Literacy: the Evolution of Ideas in a Grade Four Knowledge Building Classroom. Paper presented at the meeting of the American Educational Research Association, San Diego.

Cochran-Smith, M. (1991). Reinventing Student Teaching. Journal of Teacher Education, 42(2), 104-118.

Cohen, D. K. (Speaker). (2000). Innovation: Revisiting the Story. (Cassette Recording No. 211424-14.45). La Crescenta, CA: Audio Archives International Inc.

Cohen, D. K. & Ball D. (1999). Instruction, Capacity and Improvement. Philadelphia, PA: Consortium for Policy Research in Education, University of Pennsylvania.

Cohen, D. K. (1998a). Afterword. In Magdalene Lampert and Deborah Lowenberg Ball, Teaching, Multimedia and Mathematics (pp. 167-187). New York: Teacher's College Press.

Cohen, D. K. (1998b). Dewey's Problem. The Elementary School Journal, 98(5), 427-446.

Cohen, D. K. & Hill H. C. (1998). Instructional policy and classroom performance: The mathematics reform in California. Philadelphia, PA: Consortium for Policy Research in Education, University of Pennsylvania.

Collins, A. (1999). The Changing Infrastructure of Educational Research. In E.C. Lagemann & L. Shulman (Eds.), Issues in Education Research: Problems and Possibilities. (pp. 289-298). San Francisco: Jossey-Bass Publishers.

Collins, A. (1996). Design issues for learning environments. In S. Vosniadou, E. Decorte, R. Glaser, & H. Mandl (Eds.), International perspectives on the psychological foundations of technology-based learning environments (pp. 347-362). Mahwah, NJ: Lawrence Erlbaum Associates.

Cronbach, L.J. & Suppes, P. (Eds.). (1969). Research for tomorrow's schools: Disciplined inquiry for education. London: Collier-Macmillian Ltd.

Darling-Hammond, L. (1997a). School Reform at the Crossroads: Confronting the Central Issues of Teaching. Educational Policy, 11(2), 151-166.

Darling-Hammond, L. (1997b). The Right to Learn. San Francisco: Jossey-Bass Publishers.

Dewey, J. (1990). The School and Society and The Child and the Curriculum (Combined Edition). Chicago: University of Chicago Press.

Dewey, J. (1936). The Theory of the Chicago Experiment. In K.C. Mayhew and A.C. Edwards, The Dewey School: The Laboratory School of the University of Chicago 1896-1903 (pp. 463-477). New York: Appleton-Century.

Dewey. J. (1902). The Child and the Curriculum. Chicago: University of Chicago Press.

Dewey, J. (1900). The School and Society. Chicago: The University of Chicago Press.

Dewey, J. (1899). Three Years of the University Elementary School. In J. Dewey The School and Society and The Child and the Curriculum (Combined Edition) (pp. 163-178). Chicago: University of Chicago Press.

Dewey. J. (1896a). The Need for a Laboratory School. In The Early Works of John Dewey 1882 – 1898 5: 1895 - 1898. (pp. 433-435). Carbondale: Southern Illinois University Press.

Dewey, J. (1896b). The University School. In The Early Works of John Dewey 1882 – 1898 5: 1895 - 1898. (pp. 436-441). Carbondale: Southern Illinois University Press.

Dykhuizen, G. (1973). The Life and Mind of John Dewey. Carbondale: Southern Illinois University Press.

Elmore, R., Peterson, P. L. and McCarthey. (1997). Restructuring in the Classroom: Teaching, Learning and School Organization. San Francisco: Jossey-Bass Publishers.

Elmore, R. (1996). Getting to Scale with Good Educational Practice. Harvard Educational Review, 66(1), 1-26.

Fullan, M. (1999). Change Forces: The sequel. Philadelphia: Falmer Press.

Goodlad, J. (1994). Educational renewal: Better Teachers, Better Schools. San Francisco: Jossey-Bass Publishers.

Hasseler, S. & Collins, A. (1993). Using Collaborative Reflection to Support Changes in Classroom Practice. Evamston Illinois: School of Education and Social Policy, Northwestern University.

Jackson, P. W. (1990). New Introduction. In J. Dewey, The School and Society and The Child and the Curriculum (pp. ix-xxxvii). Chicago: University of Chicago Press.

Lampert, M. & Ball D. L. (1998). Teaching, Multimedia and Mathematics. New York: Teacher's College Press.

Lieberman, A. (1995). Practices that Support Teacher Development. Phi Delta Kappan, 76(8), 591-596.

Mayhew, K. C. & Edwards. A. C. (1936). The Dewey School: The Laboratory School of the University of Chicago 1896-1903. New York: Appleton-Century.

National Association of laboratory Schools, (1991). Laboratory Schools: An Educational Resource. University of Hawaii: Curriculum Research & Development Group.

National Commission on Excellence in Education. (1983). A Nation at Risk. Washington, DC: U.S. Department of Education.

Reeve, R., & Lamon, M. (1998, April) Factors to be Considered: Overlapping Communities of Inquiry and a Knowledge-Building Classroom. Paper presented at the meeting of the American Educational Research Association, San Diego.

Roth, W. (1998). Designing Communities. Boston:Kluwer Academic Publishers.

Scardamalia, M. (2000). Knowledge Building Principles. In the Summer Institute 2000 Database. Toronto; The Knowledge Forum Project.

Scardamalia, M. (1999). Beyond Schooling: Situating the K-12 Research Agenda in a Knowledge Society. Proposal to the Canadian Government TeleLearning National Centres of Excellence Program, Phase II.

Scardamalia, M., & Bereiter, C. (1999). Schools as Knowledge-Building Organizations. In D. Keating & C. Hertzman (Eds.), The Developmental Health and Wealth of Nations: Social Biological and Educational Dynamics. (pp. 274-289). New York: Guilford.

Scardamalia, M., & Bereiter, C. (1996). Computer support for knowledge-building communities. In T. Koschmann (Ed.), CSCL: Theory and Practice of an Emerging Paradigm (pp. 249-268). Mahwah, NJ: Lawrence Erlbaum Associates.

Scardamalia, M., & Bereiter, C. (1994). Computer support for knowledge-building communities. Journal of the Learning Sciences, 3(3), 265-283.

Scardamalia, M., Bereiter, C., McLean, R.S., Swallow, J., & Woodruff, E. (1989). Computer supported intentional learning environments. Journal of Educational Computing Research, 5(1), 51-68.

Shulman, L. (1987). Knowledge and Teaching: Foundations of the New Reform. Harvard Educational Review, 57(1), 1-22.

Tanner, L. N. (1997). Dewey's Laboratory School: Lessons for Today. New York: Teachers College Press.

Tochon, F. V. (1999). Video Study Groups for Education, Professional Development and Change. Madison, Wisconsin: Atwood Publishing.

Tyack, D., & Cuban, L. (1995). Tinkering toward Utopia: A Century of Public School Reform. Cambridge: Harvard University Press.

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